

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Beverage Storage and Dispensing Apparatus.

We, JOHN SIDNEY GOOCH, a British Subject, of 53 Milton Crescent, Edinburgh 15, Scotland, and SCOTLAND BREWERS LIMITED, a British Company, of Abbey Brewery, Holyrood Road, Edinburgh 8, Scotland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for the storage of beverages and in particular relates to an improved beer keg, cask or container. Apparatus in accordance with the invention permits easy removal of a quantity of beverage from a volume of beverage being stored within said keg, cask or container.

According to one feature of the invention, beverage storage apparatus comprises a gas-tight container having a liquid-tight collapsible bag disposed therein, an outlet in the container, a quantity of beverage within the bag, an extractor tube extending into said bag from or through said outlet and provided with an opening within the bag, a sufficient quantity of gas stored under supra-atmospheric pressure in the volume defined between the container and the bag to expel substantially the entire liquid content of the bag through said extractor tube, and closure means temporarily preventing expulsion of beverage from the container. Preferably the opening in the extractor tube is formed by the open end of the tube. Where, as is usually the case, it is desirable to ensure that the entire contents of the bag will be expelled from the container, the opening in the extractor tube should be arranged in a part of the bag to which, in the normal operating position for the container, beverage within the bag would drain. Thus for example, where the container is designed to

stand on an end remote from the outlet, the extractor tube should extend from end to end of the container so that the opening therein is adjacent to that part of the bag, which with the container correctly positioned, forms the bottom of the bag. Similarly if the container is designed to stand with the outlet end lowermost, the opening in the extractor tube should be located in that part of the bag closest to the outlet.

By storing the gas under supra-atmospheric pressure within the volume between the container and the bag instant expulsion of beverage may be obtained at any time merely by operating a dispense valve, control of the rate of expulsion preferably being through a flow-rate regulator associated with said dispense valve. Conveniently the gas is compressed air.

Preferably, after filling the bag with beverage, a sufficient charge of compressed air is forced into the volume between the container and the bag, of such pressure that the entire contents of the bag may be expelled without recharging the container with compressed air. Suitably, the apparatus incorporates a constant flow-rate valve so that, while the pressure of the gas exceeds a determined value, the maximum flow-rate of beverage through the outlet will be substantially independent of the actual gas pressure within the container.

Two particular embodiments of apparatus in accordance with the invention designed for the storage of beer, will now be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is a partially sectioned side elevation of a first embodiment of apparatus, and

Figure 2 is a partially sectioned side elevation of a second embodiment of apparatus.

The apparatus shown in Figure 1 comprises a metal beer container (1) of conventional design having an outlet (2) at one end. The outlet (2) comprises a threaded neck (3) for co-operation with the screw-threaded plug (8) forming the head of an extractor tube (4). The container (1) is adapted to rest with the outlet (2) uppermost, and references to "top" and "bottom" should be construed accordingly.

The extractor tube (4) extends internally of the container to within a short distance of the bottom of the container, the bottom end (5) of the tube being open. Suitable sealing rings (not shown) are employed between the screw-threaded plug (8) of the extractor tube (4) and the container neck (3), to ensure a gas-tight seal therebetween. Attached to the extractor tube (4) within the container to surround the lower part of the tube is a plastic bag (6). The plastic bag has a volume of some 70 to 80% of the volume of the container and is securely attached to the extractor tube (4) by a sealing ring (7) to form a liquid-tight seal therebetween. The plug (8) comprises a first passage (not shown) communicating with the bag (6) through which beer can be passed into or out of the bag and a second passage (also not shown), which may be an annular passage surrounding the first passage, through which air may be passed via openings (9), to pressurise the volume defined between the container and the bag.

The apparatus is filled and operated as follows:—

With the plastic bag secured in position around the open end (5) of the extractor tube (4), the bag and tube are inserted into the container through the outlet (2) and the threaded plug (8) of the extractor tube is tightened into position within the neck (3). A co-operating quick-release coupling (11), with liquid-tight beer supply pipe (10) is then attached to the plug (8) and beer is passed through the first passage into the bag (6) through the extractor tube (4) until the bag is full (in one particular example, the bag (6) had a capacity of nine gallons and was disposed within a metal container (1) having a capacity of some eleven gallons). Air is then passed through the second passage in the plug (8) to raise the pressure in the container to some 6 atmospheres. The construction of plug (8) is such that, when the co-operating coupling used at the filling plant (e.g., a brewery) is removed, sealing means within the plug (8) cause both the first and second passages to be automatically sealed. In this way a filled and pressurised container can be transported to a place where the beer is to be used and may safely be stored in this pressurised condition ready for instant use.

When it is desired to use the beer from

the container, the end of the supply pipe (10) remote from the coupler is attached by a liquid-tight seal to the bar dispense tap and the quick-release coupler (11) is engaged on the extractor head (8) to form a liquid-tight seal between the feed pipe (10) and the first passage, and as this seal is made the sealing means which previously prevented egress of beer from the container is opened. Beer can now flow under the pressure of the compressed air in the container, up the extractor tube (4) through the first passage in the plug (8), through the coupler (11) and along the feed pipe (10) attached thereto.

Preferably the coupler (11) or the Bar Dispense tap (not shown) incorporates a flow regulating valve (not shown) so that the flow of beer from the container is not appreciably affected by the high initial air pressure necessary to effect eventual evacuation of the bag (6).

If the apparatus of Figure 1 is to be used with the container (1) disposed horizontally rather than vertically the extractor tube (4) would be bent as shown dotted in Figure 1.

The second embodiment of apparatus in accordance with the invention is illustrated in Figure 2 and will be seen to differ from the embodiment illustrated in Figure 1 in several respects. For convenience the same reference numerals have been used in both Figures to designate the same integers.

Referring to Figure 2 it will be seen that the bag (6) is secured directly in the outlet (2) of the container (1) by means of a valve unit (20) incorporating a sealing plug (21) and a gland nut (25). Pressurisation of the volume between the bag (6) and the container (1) is effected via a non-return pressure valve (22). At the place where the beer is to be used, extractor tube (4) with its associated discharge pipe (10) is inserted into the container through the valve unit (20) and retained in position by the gland nut (25).

If desired, apparatus in accordance with the invention may be employed for the dispensing of beer directly from the container by securing the bag directly to the outlet of the container by means of a dispense valve unit in the form of a sealing plug which incorporates a flow rate control device and a manually operated member for controlling the dispense valve. At the place where the beer is to be used, dispense control is effected by the use of the manually operated member which, on being screwed open, allows flow of beer from the bag.

In practice we prefer to ensure against the possibility of the membrane forming the bag (6) obstructing the free flow of beer as the bag collapses. In the embodiments of apparatus illustrated in the drawings this is achieved by the provision of anti-choke

devices (24) each in the form of a helical stainless steel coil.

It is essential to point out that, for the satisfactory storage and dispensing of carbonated beverages, particularly filtered beer which has been chilled and carbonated, air can be used for pressurising the container only because the pressurised gas does not come into contact with the beer during storage. In conventional liquid storage apparatus where such beer is stored in direct contact with the air as the gaseous expellant, the desired quantity of CO₂ existing in solution in the beer (carbonation level) becomes reduced by transfer of CO₂ from the beer to the expellant air in accordance with natural laws: similarly, the carbonation of the beer is increased above the desired level where alternatively, pressure CO₂ in direct contact with the beer is used as an expellant.

When the containers are empty of beer, they may be returned to the brewers for refilling. Since the beer has not been in contact with the metal container, sterilising of the containers is not necessary. The plastic bags (6), may be refilled, or replaced.

WHAT WE CLAIM IS:—

1. Beverage storage apparatus comprising a gas-tight container having a liquid-tight collapsible bag disposed therein, an outlet in the container, a quantity of beverage within the bag, an extractor tube extending into said bag from or through said outlet and provided with an opening within the bag, a sufficient quantity of gas stored under supra-atmospheric pressure in the volume defined between the container and the bag to expel substantially the entire liquid content of the bag through said ex-

tractor tube, and closure means temporarily preventing expulsion of beverage from the container. 40

2. Apparatus as claimed in claim 1, in which the container is of metal. 45

3. Apparatus as claimed in claim 1 or claim 2, in which the bag is formed of a synthetic plastic material. 50

4. Apparatus as claimed in any one of the preceding claims, in which the gas in the volume between the container and the bag is air. 55

5. Apparatus as claimed in any of the preceding claims in which the liquid content of the bag has a volume of some 70 to 80% of the volume of the container. 60

6. Apparatus as claimed in any one of the preceding claims, in which the bag is sealed around the extractor tube. 65

7. Apparatus as claimed in any one of the preceding claims, in which the opening in the extractor tube is provided in that part of the bag to which in the operating position of the container, beverage would drain. 70

8. Apparatus as claimed in any one of the preceding claims, in which the opening in the extractor tube is provided with an anti-choke device. 75

9. Beer storage apparatus substantially as hereinbefore described with reference to and as illustrated in, Figure 1 or Figure 2 of the accompanying drawings. 80

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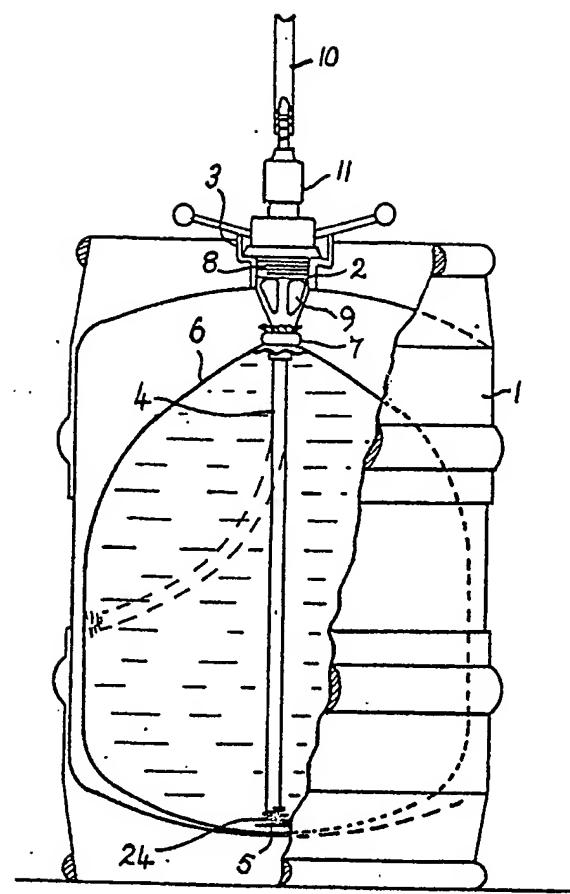


FIG. I

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the Original on a reduced scale
Sheets 1 & 2*

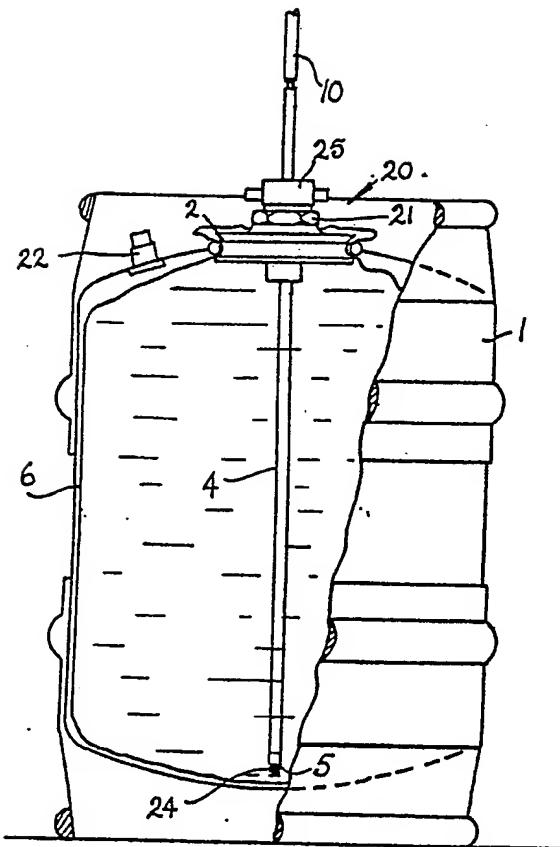


FIG. 2

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2 SHEETS This drawing is a reproduction of
the original on a reduced scale
Sheets 1 & 2

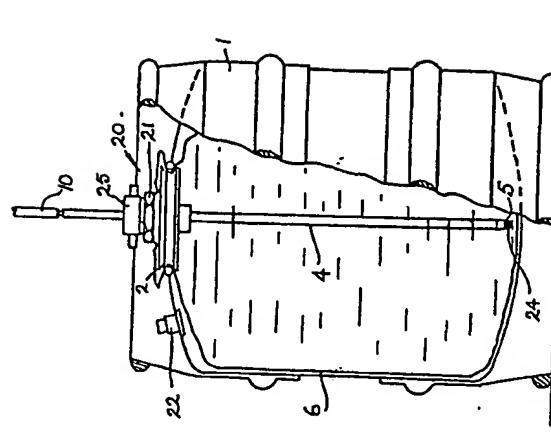


FIG. 2

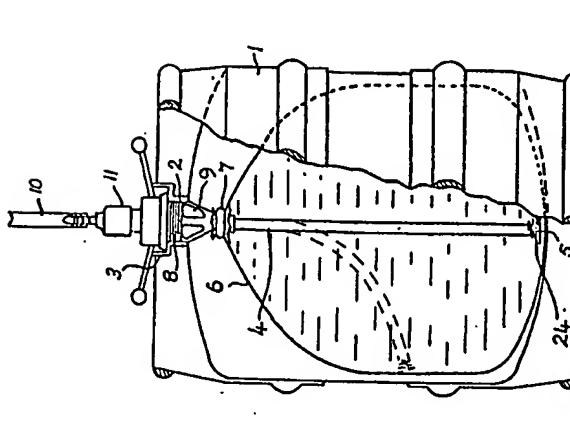


FIG. 1